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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/750,988

01/02/2004

Klaus Hartig

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04/26/2006

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EXAMINER

BAREFORD, KATHERINE A

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 04/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/750,988

Applicant(s)

HARTIG, KLAUS

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) 1-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The Response of March 14, 2006 has been received and considered.

Election/Restrictions

1. This application contains claims 1-38 drawn to an invention nonelected with traverse in the reply filed on Nov. 21, 2005. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hyllberg (US 5707326) in view of Boguslavsky et al (US 4957058).

Hyllberg teaches a method of uniformly coating a cylindrical target (substrate). Column 3, lines 1-10 and column 4, lines 35-50 and figure 1. The coating process includes providing a cylindrical target. Column 4, lines 15-30. The target can be pretreated to clean and roughen, it. Column 4, lines 25-30. Then, optionally, a bonding

layer is applied. Column 4, lines 30-35. Then a ceramic coating layer is applied using plasma spray equipment. Column 4, lines 35-50. The plasma spray is performed by activating plasma spray equipment to plasma spray particles of coating toward the target. Column 4, lines 35-50 and column 6, lines 10-30. The step is carried out by spraying thin uniform sublayers to arrive at a desired thickness of the ceramic layer. Column 4, lines 35-50. This will provide a desired uniform coating of desired thickness.

Hyllberg teaches all the features of these claims except the spraying method using a target assembly and the moving system.

However, Boguslavsky teaches a method of apply gas thermal coatings (which would apparently be thermal spray coating, or at the least spray coatings) to cylindrical substrates. Column 3, lines 55-65, column 4, lines 5-10 and 60-65 and figure 1 (cylindrical target = workpiece 9). The method includes mounting a cylindrical target to a target assembly that holds the target. Figure 1 and column 3, line 65 through column 4, line 5. The target can be rotated at a constant, set rate to perform coating. Figure 1 and column 5, lines 5-30. The spray device is activated to spray a coating onto the target in a desired fashion. Column 5, lines 5-30 and figure 1. It is indicated that the motion of the target can be started and stopped at varying, unexpected, points during the coating process. Column 5, lines 25-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hyllberg to use a cylindrical target holder and application device system as suggested by Boguslavsky in order to provide a desirable

coating, because Hyllberg teaches a desire to apply coating to a cylindrical target using a spray system and Boguslavsky teaches a device and method for achieving controlled coating using a cylindrical target holder and rotater and a spray device holder and mover.

4. Claims 41, 44, 45 and 47-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hyllberg in view of Boguslavsky as applied to claims 39 and 40 above, and further in view of Lauterbach (US 3900639).

Hyllberg in view of Boguslavsky teach all the features of these claims except the gas flow to divert smaller particles.

However, Lauterbach teaches a method of plasma spraying. Column 3, lines 10-30. Lauterbach teaches to direct a gas flow across the plasma stream between the plasma spray device and the substrate. Column 3, lines 10-50. This gas flow causes lighter (which would include smaller) particles to be blown out of the plasma stream and conveyed outside of the range or area of the surface of the workpiece to be coated. Column 3, lines 15-45 and 55-65. The substrate can be a cylinder. Column 4, lines 60-65 and figure 4. The specific sizes (volumes) of material to be removed can be precisely controlled by varying the speed, etc. of the gas spray based on the material to be used. Column 6, lines 5-20. The gas can be anaerobic, such as argon or nitrogen. Column 5, lines 15-20. The gas can also be reducing, such as hydrogen or air. Column 5, lines 15-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hyllberg in view of Boguslavsky to use the diverting gas as suggested by Lauterbach in order to provide a more uniform coating, as Hyllberg in view of Boguslavsky desires to apply a uniform coating and Lauterbach teaches a method that allows for a more uniform coating by directing a diverting gas flow across the plasma stream that removes small and undesirable particles. Lauterbach also provides that the gas can be anaerobic, nitrogen, or reducing. It further would have been obvious to perform routine experimentation based on the specific material to be used to optimize the gas flow rate (speed) to remove particles of less than a predetermined size, and to determine the optimum of that size, because Lauterbach teaches that specific sizes (volumes) of material to be removed can be precisely controlled by varying the speed, etc. of the gas spray based on the material to be used.

5. Claims 43, 46 and 52 rejected under 35 U.S.C. 103(a) as being unpatentable over Hyllberg in view of Boguslavsky and Lauterbach as applied to claims 41, 44, 45 and 47-51 above, and further in view of Borom et al (US 5897921).

Hyllberg in view of Boguslavsky and Lauterbach teaches all the features of these claims except the directing of a gas flow or blast on a surface location of the target proximate the deposition zone to preclean.

However, Borom teaches a method of plasma spray coating a rotating substrate. Figure 1 and column 3, lines 15-25. Borom teaches that prior to coating, a preheating

device 26, which can be, for example, another conventional air plasma torch (without powder injection) or other gas torch, is directed at the area to be coated to raise the temperature such that localized melting will take place upon coating. Column 4, lines 30-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hyllberg in view of Boguslavsky and Lauterbach to use the preheating gas as suggested by Borom in order to provide a better bonding of the applied coating and to preclean, as Hyllberg in view of Boguslavsky and Lauterbach desires to apply a uniform coating by plasma spraying and Borom teaches a method that allows for an improved bonding of the applied coating by preheating the area to be coated with another plasma torch. It is the Examiner's position that this would inherently provide a precleaning of the area as well, due to the temperature of the plasma torch and the temperature needed to raise the area to the melting point.

6. Claims 42 rejected under 35 U.S.C. 103(a) as being unpatentable over Hyllberg in view of Boguslavsky as applied to claims 39 and 40 above, and further in view of Borom et al (US 5897921).

Hyllberg in view of Boguslavsky teaches all the features of these claims except the directing of a gas flow or blast on a surface location of the target proximate the deposition zone to preclean.

However, Borom teaches a method of plasma spray coating a rotating substrate. Figure 1 and column 3, lines 15-25. Borom teaches that prior to coating, a preheating device 26, which can be, for example, another conventional air plasma torch (without powder injection) or other gas torch, is directed at the area to be coated to raise the temperature such that localized melting will take place upon coating. Column 4, lines 30-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hyllberg in view of Boguslavsky to use the preheating gas as suggested by Borom in order to provide a better bonding of the applied coating and to preclean, as Hyllberg in view of Boguslavsky desires to apply a uniform coating by plasma spraying and Borom teaches a method that allows for an improved bonding of the applied coating by preheating the area to be coated with another plasma torch. It is the Examiner's position that this would inherently provide a precleaning of the area as well, due to the temperature of the plasma torch and the temperature needed to raise the area to the melting point.

7. Kazakos et al (US 6226483) also teaches providing a uniform coating by plasma spraying to a cylinder. Vanderstraeten (US 5853816) teaches applying a coating to a cylindrical sputter target by plasma spraying.

Response to Arguments

8. Applicant's arguments filed March 14, 2006 have been fully considered but they are not persuasive.

The Examiner has reviewed applicant's arguments as to the rejection of claims 39 and 40 using Hyllberg in view of Boguslavsky, at pages 16-20 of the response, however, the rejection is maintained. While Hyllberg requires steps after the application of the thermal sprayed coating, this is not prevented by the claims as worded. As to the argument that the provided plasma spray coating of Hyllberg would not be uniform as claimed, because later steps of machining and polishing are provided, the Examiner disagrees. The fact that Hyllberg may have some degree of roughness or "peaks" does not prevent a "uniform" coating from being applied as claimed. Hyllberg teaches that the applied ceramic layer 16 is applied by "spraying thin uniform sublayers to arrive at a desired thickness of the ceramic layer 16" and that the "ceramic layer 16 has a substantially uniform, predictable dielectric strength" (see column 4, lines 40-50). The application of uniform sublayers and desire for uniform results clearly indicates that a "uniform" layer 16 is applied to the extent required by the claims. The application as filed provides no indication of a minimum roughness needed to be considered "uniform" and thus, one of ordinary skill in the art would understand that a teaching in the art of thermal spraying of providing a "uniform" coating would apply a coating reading on the claimed "uniform" coating. As to the consultation of Boguslavsky by one contemplating the Hyllberg reference, the question is not would Hyllberg, at the time Hyllberg was making the reference look to the reference of Boguslavsky. Rather,

the question is would it be obvious to one of ordinary skill in the art at the time applicant is making the invention find it obvious to make the claimed invention. Here, one of ordinary skill in the art, looking at the reference to Hyllberg, which teaches applying a spray coating to a cylindrical target, without detailed explanation as to the actual mechanics of spraying such a cylindrical target, would look to the reference to Boguslavsky, which provides a desirable method of the mechanics of spraying a cylindrical target using a target holder, etc, as discussed in the rejection above. As to the further process steps of Hyllberg obviating a motivation for modifying the plasma coating process of Hyllberg, the Examiner disagrees. Prior to any later treatments, an acceptable method of applying the plasma sprayed coating must be provided, and one of ordinary skill in the art would clearly be suggested that individual steps in a process would be desirably be performed in an advantageous manner. As to the starting and stopping of the motion of the target at varying points, while Boguslavsky may teach responding to unexpected stops, but these would nonetheless be starting and stopping within the extent claimed by applicant. There is nothing in the claim to prevent the stops from being unexpected.

The Examiner has reviewed applicant's arguments as to the rejection of claims 41, 44, 45 and 47-51 using Hyllberg in view of Boguslavsky and further in view of Lauterbach, at pages 20-24 of the response, however, the rejection is maintained. As to the arguments as to the use of Hyllberg in view of Boguslavsky, those are addressed above. As to that argument that Hyllberg and Boguslavsky do not mention the problem

addressed by Lauterbach, the Examiner notes that the problem of decomposition particles is addressed by Lauterbach. However, Lauterbach fully discusses the problems caused by these materials and the solution to preventing the problem of these materials. The mere fact that the primary reference does not disclose every possible problem that can occur in a coating process does not mean that one of ordinary skill in the art would not attempt to solve for known problems. Here Lauterbach specifically teaches a way to get a more advantageous coating when plasma spraying. As discussed above, Hyllberg does teach the desire for a "uniform" coating as claimed, and thus, one of ordinary skill would look to methods that provide a more uniform coating. As to the size of particles removed by Lauterbach, Lauterbach teaches that the particles are removed based on a weight classification, which is taught as related to size. Column 3, lines 15-20 and 35-40. As a result, smaller particles are removed to the extent claimed. As to the requirements of claim 47, the Examiner has noted that it would be obvious to perform routine experimentation as to this issue, given the mechanism that Lauterbach teaches as to the removal of materials and the teaching that the specific sizes to be removed can be precisely controlled. As to applicant's arguments that embodiments of applicant's invention are directed to a cylindrical target for magnetron sputter coating, the Examiner notes that such is not required or claimed.

The Examiner has reviewed applicant's arguments as to the rejection of claims 43, 46 and 52 using Hyllberg in view of Boguslavsky and Lauterbach, and further in view of Borom, at pages 24-26 of the response and the Examiner has reviewed

applicant's arguments as to the rejection of claim 42 using Hyllberg in view of Boguslavsky and further in view of Borom, at pages 26-27 of the response, however, the rejections are maintained. As to motivation to look to Borom, this does not have to be found directly in Hyllberg, Boguslavsky or Lauterbach. The mere fact that the primary reference does not disclose every possible problem that can occur in a coating process does not mean that one of ordinary skill in the art would not attempt to solve for known problems. Here Borom specifically teaches a way to get a more advantageous coating when plasma spraying multiple layers, and Hyllberg teaches to plasma coat multiple layers. In response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991). As to the argument that Borom does not provide "precleaning" as claimed, it is the Examiner's position that the melting temperature reached would provide "precleaning" to the extent claimed, because the plasma gas impacting the surface to the extent required to melt would mean that the plasma gas impacts the surface, and as claimed this is what provides the "precleaning".

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER